Appendix A

Operations in Special Environments

Environments that have a major influence on the conduct of military operations are—
- Mountain areas.
- Jungle areas.
- Desert areas.
- Cold weather regions.
- Urban areas.

Each of these environments has a different influence on NBC recon operations.

Mountain Areas

Excluding the extremely high, alpine-type mountains, most mountain systems are characterized by—
- Heavy woods or jungle.
- Compartments and ridge systems.
- Limited lines of communication, usually of poor quality.
- Highly variable weather conditions.

NBC recon units operate with attached elements or in direct support of brigade-sized units. Since mountain operations are decentralized, NBC recon leaders usually operate independently or semi-independently of their parent units.

NBC recon units concentrate on low terrain for persistent chemicals and on prominent terrain features for radiological hot spots produced by fallout.

Jungle Areas

The jungles of Asia, Africa, and the Western Hemisphere are potential battlefields. Jungle terrain is characterized by—
- Heavy vegetation, varying from rain forest to savanna.
- Constant high temperatures.
- Heavy rainfall during certain seasons.
- Constant high humidity.

As in mountain operations, NBC jungle operations are decentralized as much as possible. Recon elements maybe placed in direct support.

Due to the hot, humid conditions prevalent in jungle environments, frequent work breaks and reduction of MOPP levels by recon personnel will become necessary. Unfortunately, the jungle environment tends to make chemical agents more persistent and more effective in producing casualties. These factors combine to complicate timely NBC recon operations.

Desert Areas

Deserts are semiarid and arid regions containing a variety of soils in varying relief. Desert regions are characterized by—
- Extreme temperature ranges, varying between 30 degrees Fahrenheit (-1 degree Celsius) and 130 degrees Fahrenheit (54 degrees Celsius) over a 24-hour period.
- Changing visibility conditions.
- Long periods of drought.
- Shortage of suitable ground water.
- Large areas of excellent trafficability interspersed by ravines, bogs, and sand seas.
- An absence of pronounced terrain features.

The principal problem NBC reconnaissance units face in desert operations is lack of water. For example, without an outside water source, a decontamination unit can operate a deliberate decon station for only a short period. While conducting recon, knowing the locations of water sources is extremely important. There are additional recon problems in desert environments. Contamination found in a desert may become covered up then suddenly reappear because of shifting sands. Once an area has been contaminated, it must be periodical y monitored.

Extreme temperature ranges and soil compositions found in the desert complicate recon operations. The high temperatures during the day inhibit movement of personnel in high MOPP levels, in addition to possibly causing malfunctions in equipment, and detectors being used outside of their usual operating ranges. The relative lack of cover and concealment in desert terrain make security a problem during any daylight operations. As a consequence, night probably becomes the usual time of operation, even though lack of light will complicate the reading use of chemical detection paper and kits. Soil composition will adversely effect the detection capabilities of the M93

NBCRS since liquid contamination will be absorbed by the soil.

Note: The M93 NBCRS must be operated with the air conditioner on in hot temperatures to prevent damage to onboard equipment. The system will operate effectively for one hour with the air conditioner turned off or the vehicle power source turned off,

Cold Weather Regions

Northern regions, including the arctic and subarctic, comprise about 45 percent of the North American continent and 65 percent of the Eurasian land mass. Northern regions are characterized by—

- Extreme cold and deep snow during winter months.
- Spring breakup, resulting in poor trafficability.
- White out and greyout, which cause loss of depth perception, making flying and driving hazardous.
- Ice fog, in which clouds of ice crystals cover troops, vehicles, bivouac areas, and permanent facilities.

When temperatures go below 32 degrees F (0 degrees Celsius), decon and recon elements have difficulty operating and maintaining their equipment.

Toxic chemicals also react differently at extremely low temperatures. For example, blister agents such as distilled mustard, phosgene oxime, and mustard-Lewisite mixture-become solids well above the freezing point of water. As the temperature drops to -15 degrees F (-26° C), two blood agents (hydrogen cyanide and cyanogen chloride) and three blister agents (HN3, L, and PD) become solids. At -70 degrees F (-57° C), only four toxic chemicals remain in liquid form: CG, SA, HN2, and ED. All of the remaining agents become solids, including nerve agents.

Munitions containing persistent agents normally become more persistent at low temperatures, If a soldier gets a solid agent on his clothing, he will probably not detect it, since it has no effect in solid form.

NBC recon operations are adversely affected by extreme cold. Electronic instruments, such as radiacmeters and automatic chemical agent alarms, become less dependable and may even fail. Chemical detection and identification kits cannot detect solid agents. It may be necessary to take soil, snow, or vegetation samples from suspicious areas and warm them to detect and identify chemical agents.

Urban Areas

Urban areas have a significant influence on military operations. Today, it is difficult to avoid built-up areas, particularly in Western Europe. Urbanized terrain is characterized by—

- Villages (population of 1,000 or less).
- Towns and small cities that are not part of a large urban complex (population more than 1,000 but less than 100,000).
- Strip areas that connect villages and towns along roads and valleys.
- Large cities with associated urban sprawl (population more than 100,000 and covering 100 or more square miles),

Chemical agents tend to act differently in built-up areas. Low-lying areas tend to collect residual chemical contamination. In an urban environment, even nonpersistent agents may enter buildings or seep into piles of rubble, which may enhance their persistency.

Buildings also provide shelter for chemical hazards and make predictions extremely inaccurate. Shifting winds might contaminate buildings and the areas around them but leave an adjacent area relatively free of contamination. Units should check areas they plan to occupy, even if only for a short term, including basements, wells, and sewers.